What is claimed is:

1. A method for stimulating nerves in the central nervous system of a mammal to regenerate within the central nervous system comprising the step of applying an oscillating electrical field to the spinal cord wherein the electrical field's polarity reversal period is less than a die back period of anodally facing axons in the central nervous system.

2. The method of claim 1 and further including the step of generating the oscillating electrical field with a polarity reversal period that is long enough to stimulate growth of cathodally facing axons in the central nervous system but less than the die back period of the anodally facing axons in the central nervous system.

3. The method of claim 2 wherein the polarity reversal period of the oscillating electrical field is in the range of thirty seconds to sixty minutes.

4. A method for stimulating axon growth in the spinal cord of a mammal to stimulate nerve regeneration comprising the step of applying an oscillating electrical field across a lesion in the spinal cord wherein the oscillating electrical field's polarity reversal period is less than a die back period of anodally facing axons in the spinal cord.

5. The method of claim 4 and further including the step of generating the oscillating electrical field with a polarity reversal period that is long enough to stimulate growth of cathodally facing axons in the spinal cord but less than the die back period of the anodally facing axons in the spinal cord.

6. The method of claim 5 wherein the polarity reversal period of the oscillating electrical field is in the range of thirty seconds to sixty minutes.

7. A method for stimulating nerves in the central nervous system of a mammal to regenerate within the central nervous system comprising the steps of implanting electrodes on opposite sides of a lesion, generating an oscillating electrical field that has a polarity reversal period less than the die back period of anodally facing axons, applying the oscillating electrical to the electrodes to apply the oscillating electrical field to the central nervous system.

8. The method of claim 7 wherein the polarity reversal period of the oscillating electrical field is in the range of thirty seconds to sixty minutes.

9. A method for stimulating nerves in the central nervous system of a mammal to regenerate, said nerves having nerve cells with caudally extending axons and rostrally extending axons, comprising the steps of applying a constant current DC stimulus to the central nervous system and reversing the polarity of the DC stimulus after a predetermined period of time which is long enough to stimulate axon growth of cathodally facing axons of the nerve cells but is shorter than a die back period of anodally facing axons.

10. The method of claim 9 wherein the polarity of the DC stimulus is reversed each time the predetermined period of time elapses.

11. The method of claim 10 wherein the predetermined period is in the range of thirty seconds to sixty minutes.

12. An apparatus for stimulating nerves in the central nervous system of a mammal to regenerate within the central nervous system, comprising means for generating an oscillating electrical field which has a polarity reversal period less than a die back period of anodally facing axons of the nerves to be stimulated and means for coupling an output of the generating means to the central nervous system.

13. The apparatus of claim 12 wherein the output of the generating means comprises first and second oppositely polarized output terminals and the means for coupling the output of the generating means to the central nervous system comprises first and second electrodes coupled respectively to the first and second outputs of the generating means, the first and second electrodes being implanted on opposite sides of a lesion in the central nervous system.

14. The apparatus of claim 13 wherein the means for generating the oscillating electrical field includes means for generating the oscillating electrical field with a polarity reversal period long enough to stimulate growth of cathodally facing axons of the nerves to be stimulated but less than the die back period of anodally facing axons of the nerves.

15. The apparatus of claim 14 wherein the means for generating the oscillating electrical field generates the oscillating electrical field with a polarity reversal period in the range of thirty seconds to sixty minutes.

16. An apparatus for stimulating axon growth of the nerve cells in the spinal cord of mammals to

stimulate regeneration of the nerve cells in the spinal cord, comprising means for generating a constant current DC stimulus, the generating means having a first and second oppositely polarized output terminals wherein one output terminal comprises a cathode and the other output terminal comprises an anode of the generating means, means for coupling the first and second output terminals to the spinal cord on opposite sides of a lesion, and means for reversing the polarity of the DC stimulus each time a predetermined period of time elapses, the predetermined time period being long enough to stimulate growth of cathodal facing axons but shorter than a die back period of anodal facing axons, and wherein each time the polarity of the DC stimulus is reversed the output terminal which comprised the cathode before the polarity reversal comprises the anode after the polarity reversal and the output terminal which comprised the anode before the polarity reversal comprises the cathode after the polarity reversal.

17. The apparatus of claim 16 wherein the means for coupling the first and second output terminals to the spinal cord comprises first and second electrodes coupled respectively to the first and second output terminals and respectively implanted in the body of the mammal on opposite sides of the lesion.

18. The apparatus of claim 16 wherein the means for coupling the first and second output terminals to the spinal cord comprises first and second electrodes coupled respectively to the first and second output terminals and respectively implanted in the body of the

mammal adjacent the spinal cord on opposite sides of the lesion.

19. The apparatus of claim 17 and further including means for timing the predetermined period of time and providing an output signal when the predetermined time period elapses, the timing means including means for setting the predetermined period of time in the range of thirty seconds to sixty minutes, means for coupling the timing means' output signal to the polarity reversing means, the polarity reversing means reversing the polarity of the DC stimulus in response to the output signal of the timing means.

20. The apparatus of claim 18 and further including means for timing the predetermined period of time and providing an output signal when the predetermined time period elapses, the timing means including means for setting the predetermined period of time in the range of thirty seconds to sixty minutes, means for coupling the timing means' output signal to the polarity reversing means, the polarity reversing means reversing the polarity of the DC stimulus in response to the output signal of the timing means.